The Philippine Action Plan to Combat Antimicrobial Resistance: One Health Approach
THE PHILIPPINE ACTION PLAN TO COMBAT ANTIMICROBIAL RESISTANCE: ONE HEALTH APPROACH
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FOREWORD:

MALACAÑAN PALACE
MANILA

MESSAGE

My warmest greetings to the Department of Health and the Inter-agency Committee on Antimicrobial Resistance (ICAMR) as you hold your First Philippine AMR Summit.

We are faced with the serious threat of antimicrobial resistance (AMR), a condition that may lead to an even greater number of people falling into severe and prolonged illnesses, resulting in an increased mortality rate and healthcare costs for our people. Its damage extends to animal health and impedes economic development and global security.

The World Health Organization has issued the call for a more proactive stance against the advent of highly-resistant pathogens; the Philippines, through the creation of the ICAMR led by the Department of Health and Department of Agriculture, has joined global efforts to fight AMR, in partnership with the Department of Science and Technology, Department of Trade and Industry, and the Department of Interior and Local Government.

This summit is but the first step in crafting the “Philippine Action Plan to Combat AMR: One Health Approach,” which highlights the urgency to strengthen the surveillance system for AMR, and delve deeper into the advancement of its detection and treatment processes. With your stakeholders present at this gathering, may you continue to lay out plans and strategies to ensure the accessibility and availability of effective antimicrobial medicines and safeguard the rational use of antibiotics on people and animals alike; may we always remain vanguards of the Filipino people's interest and welfare as, together, we build an empowered, more productive Philippines.

We look forward to the success of this event yielding more vibrant, dynamic synergy among our agencies.

BENIGNO S. AQUINO III
President
MESSAGE

Antibiotics have been useful in fighting infectious diseases in our country for decades, but because of the overuse and misuse of these agents, an increasing number of organisms are now resistant to them. The Philippines, like other Southeast Asian countries, has already been encountering the many challenges of antimicrobial resistance (AMR) which include increasing social and economic costs and rising patient mortality. Although considered a global threat, it is already an emerging local health concern which calls for an urgent collaboration among different sectors to provide solutions addressing this growing problem.

To address this issue, all responsible agencies are expected to exert political commitment and leadership in taking initiatives to protect our nation from the threat of AMR. There is a need to implement rational use of antimicrobials in both human medicine and animal husbandry, provide incentives for research and development of both new antimicrobials and vaccines, strengthen our country’s monitoring and surveillance of AMR, strengthen infection prevention and control programs, and develop additional or more complex measures to hinder the further spread of this phenomenon. This is an attainable endeavor with the help of both international and local partners working towards a common goal.

The Department of Health, together with the Department of Agriculture, Department of Science and Technology, Department of Trade and Industry and Department of the Interior and Local Government, spearheaded the creation of the Philippine Action Plan to Combat AMR, following the Six-Point Policy Package by the World Health Organization as part of our commitment to the global health agenda against AMR. This is a multifaceted and holistic strategy to consolidate the fragmented efforts and systems in the country by enabling different stakeholders such as health professionals, policy makers and other government systems to use it as a platform for national campaigns on prudent antibiotic use. This is an initiative to sustain concrete actions that will curve AMR for our future generations.

AMR in the Philippines is a national priority. We are enjoining everyone to take part in battling one of the most pressing concerns in the health of our country today.

JANETTE P. LORETO-GARIN, MD, MBA-H
Secretary of Health
MESSAGE

The use of antimicrobials in animals is essential to combat economically important animal diseases, thus, contributing to the general animal welfare and livestock trade. Alongside with this, it is important that prudent and judicious use of antimicrobials in animals must be put into practice in order not to pose a risk of developing antimicrobial resistance and emergence of antibiotic-resistant bacteria both in the primary animal production and post-harvest of animal products such as, meat from livestock, poultry and fish, eggs and milk. The resistant bacteria may contaminate the food that come from those animals and may cause the development of antibiotic-resistant infections to those individual who consume these foods.

The issue of antimicrobial resistance in animal health is a multi-sectoral concern that may start from animal production rearing and persists up to the post-harvest of animal products. Stakeholders of the animal industry must all be involved in order to address the issue of the public health risk of AMR. There is a need to have a collaborative effort in order to combat antimicrobial resistance in the country.

The Department of Agriculture has already expressed and extended its active participation to support and enact the strategic actions that the Inter-Agency Committee on Antimicrobial Resistance has drafted in order to have a unified approach and policy to address the issue of AMR in the country. With guidance coming from international organizations such as the WHO, ASEAN, FAO and OIE, this issue on AMR must be taken seriously and of utmost priority so that we may secure public health safety and welfare. We need to move the scientific findings and translate it to concrete government policies and programs to assure that we are indeed protected from the threat of AMR in future generations.

With this, we hope that everyone who is participating in this endeavor may continuously strive to uphold our goals, vision and mission to combat AMR in the Philippines.

Thank you and more power!
**LIST OF ABBREVIATIONS:**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMR</td>
<td>Antimicrobial Resistance</td>
</tr>
<tr>
<td>ANSORP</td>
<td>Asian Network for Surveillance of Resistant Pathogens</td>
</tr>
<tr>
<td>APEC</td>
<td>Asia-Pacific Economic Cooperation</td>
</tr>
<tr>
<td>ARSP</td>
<td>Antimicrobial Resistance Surveillance Program</td>
</tr>
<tr>
<td>ARSC</td>
<td>Antimicrobial Resistance Surveillance Committee</td>
</tr>
<tr>
<td>ARSRL</td>
<td>Antimicrobial Resistance Surveillance Reference Laboratory</td>
</tr>
<tr>
<td>CPE</td>
<td>Continuing Professional Education</td>
</tr>
<tr>
<td>CSA</td>
<td>Country Situation Analysis</td>
</tr>
<tr>
<td>DTC</td>
<td>Drug and Therapeutics Committee</td>
</tr>
<tr>
<td>DA</td>
<td>Department of Agriculture</td>
</tr>
<tr>
<td>DOST</td>
<td>Department of Science and Technology</td>
</tr>
<tr>
<td>EFSA</td>
<td>European Food Safety Authority</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>FEU</td>
<td>Far Eastern University</td>
</tr>
<tr>
<td>GMPs</td>
<td>Good Manufacturing Practices</td>
</tr>
<tr>
<td>ICAMR</td>
<td>Inter-Agency Committee on AMR</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education and Communication</td>
</tr>
<tr>
<td>IPC</td>
<td>Infection Prevention and Control</td>
</tr>
<tr>
<td>LCP</td>
<td>Lung Center of the Philippines</td>
</tr>
<tr>
<td>LOS</td>
<td>Length of Stay</td>
</tr>
<tr>
<td>MeTA</td>
<td>Medicines Transparency Alliance</td>
</tr>
<tr>
<td>MTb</td>
<td>Mycobacterium Tuberculosis</td>
</tr>
<tr>
<td>NKI</td>
<td>National Kidney Institute</td>
</tr>
<tr>
<td>PGH</td>
<td>Philippine General Hospital</td>
</tr>
<tr>
<td>PhilPSP</td>
<td>Philippine Practice Standards for Pharmacists</td>
</tr>
<tr>
<td>PNDP</td>
<td>Philippine National Drug Policy</td>
</tr>
<tr>
<td>RITM</td>
<td>Research Institute for Tropical Medicine</td>
</tr>
<tr>
<td>SLH</td>
<td>San Lazaro Hospital</td>
</tr>
<tr>
<td>STGs</td>
<td>Standard Treatment Guidelines</td>
</tr>
<tr>
<td>STU</td>
<td>Sto. Tomas University Hospital</td>
</tr>
<tr>
<td>TWG</td>
<td>Technical Working Group</td>
</tr>
<tr>
<td>UST</td>
<td>University of Santo Tomas</td>
</tr>
<tr>
<td>UPM</td>
<td>University of the Philippines Manila</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WHA</td>
<td>World Health Assembly</td>
</tr>
</tbody>
</table>
CHAPTER 1: The Emergence of Antimicrobial Resistance

1.1 The Phenomenon of Drug Resistance

The introduction of antimicrobials in the 1940’s transformed the field of public health and medicine. The discovery of penicillin and other antibiotics has been regarded as a therapeutic revolution giving cure to lethal infectious diseases such as pneumonia, sepsis and meningitis as well as disabling infections of the bones and joint stretching the boundaries of science in solving man’s greatest afflictions. Today however, the miracle cure provided by antibiotics for common infections is being eroded by the emergence of drug resistance leading to prolonged and more expensive treatment as well as diminishing therapeutic choices among patients and healthcare providers.

Antimicrobial resistance (AMR) is defined as the ability of microbes, such as bacteria, viruses, parasites or fungi to grow despite the presence of antimicrobials that would normally kill or inhibit their growth rendering antibiotics ineffective against previously treatable infections. The development of drug resistance can be due to the inherent resistant characteristics of microorganisms or through the acquisition of genes from other organisms that can be passed both horizontally and vertically to their progeny. However, this phenomenon is aggravated by many human factors largely through the misuse and abuse of antibiotics leading to the loss of their efficacy and the spread of drug resistant pathogens in the community (see Figure 1).

Figure 1. Factors that contribute to AMR in the human sector

![Diagram showing factors contributing to AMR in healthcare providers, industry, and patients.]

- HEALTHCARE PROVIDERS: Inappropriate treatment regimens
  - Absence of guidelines
  - Noncompliance with guidelines
  - Lack of training
  - No treatment monitoring
  - Poor infection control practices

- INDUSTRY: Poor integrity of the supply chain
  - Poor quality of drugs
  - Unavailability of drugs
  - Poor storage conditions
  - Wrong dose or combinations
  - High drug costs

- PATIENTS: Irrational drug use
  - Poor adherence
  - Prescription-sharing
  - Self prescription
  - Treatment interruptions
  - Social and Economic Barriers
  - Health illiteracy
1.2 The Global Problem of AMR

AMR is a rampantly growing public health concern worldwide. The World Health Organization (WHO) and countries around the world are beginning to be threatened by the possibility of reaching a post-antibiotic era, where the most common infectious diseases can kill millions of lives. According to the 2014 AMR Global Report on Surveillance of the WHO, there are already very high rates of resistance in bacteria that cause common health-care associated and community-acquired infections in all the WHO regions. In summary, some of the drug resistant pathogens worldwide are the following:

<table>
<thead>
<tr>
<th>Name of Bacterium / Resistance</th>
<th>Examples of typical diseases</th>
<th>No. out of 194 Member States Providing Data</th>
<th>No. of WHO Regions with National Reports of 50% Resistance or More</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Escherichia coli</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. 3rd gen. cephalexins</td>
<td>Urinary tract infections, blood stream infections</td>
<td>86</td>
<td>5/6</td>
</tr>
<tr>
<td>Vs. fluoroquinolones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Klebsiella pneumonia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. 3rd gen. cephalexins</td>
<td>Pneumonia, blood stream infections, urinary tract infections</td>
<td>87</td>
<td>6/6</td>
</tr>
<tr>
<td>Vs. carbapenems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Staphylococcus aureus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. methicillin “MRSA”</td>
<td>Wound infections, blood stream infections</td>
<td>85</td>
<td>5/6</td>
</tr>
</tbody>
</table>

Table 2. Bacteria mainly causing infections in the community

<table>
<thead>
<tr>
<th>Name of Bacterium / Resistance</th>
<th>Examples of typical diseases</th>
<th>No. out of 194 Member States Providing Data</th>
<th>No. of WHO Regions with National Reports of 50% Resistance or More</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Streptococcus pneumoniae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-susceptible or resistant to penicillin</td>
<td>Pneumonia, meningitis, otitis</td>
<td>67</td>
<td>6/6</td>
</tr>
<tr>
<td><strong>NTMopathoid Salomonella</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. fluoroquinolones</td>
<td>Foodborne diarrhea, blood stream infections</td>
<td>68</td>
<td>3/6</td>
</tr>
<tr>
<td><strong>Shigella species</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. fluoroquinolones</td>
<td>Diarrhea (“bacillary dysentery”)</td>
<td>35</td>
<td>2/6</td>
</tr>
<tr>
<td><strong>Neisseria gonorrhoeae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vs. 3rd gen. cephalexins</td>
<td>Gonorrhoea</td>
<td>42</td>
<td>3/6</td>
</tr>
</tbody>
</table>
1.3 The Health and Economic Burden of AMR

When first-line drugs no longer work for the patients, the health providers need to resort to second-line antimicrobials, which are not only more expensive, but also necessitate closer monitoring. Possible health implications resulting from AMR are increased mortality rates, prolonged hospital stay, admission to the intensive care unit (ICU), and the spread of resistant microorganisms to other patients. Consequently, AMR can also translate to increased costs due to prolonged illness and hospitalization. Patients, then, become more at risk of nosocomial infections, which are even more difficult to treat. Further, the death rate of patients, who are treated in hospitals and have serious infections caused by resistant microbes, is estimated to be twice than that of patients with infections caused by non-resistant bacteria.

In a paper entitled “Antimicrobial Resistance: Tackling A Crisis for the Health and Wealth of Nations,” the threat of AMR is projected to intensify till 2050 leading to 10 million deaths annually and global economic losses approximating 100 trillion US dollars or a reduction in the world's Gross Domestic Product (GDP) by 2-3.5 percent per year (O’Neill, 2014). Moreover, countries such as the Philippines that currently have high malaria, HIV and TB cases, along with AMR, are expected to suffer more. Microorganisms in animals may cause financial losses to farmers and consumers, and affect the confidence of the public on food safety, thereby reducing the demand on these food products.

1.4 AMR Strategies at the Global and National Levels

The “One Health Approach” recognizes the interdependence of the human, animal, environmental and economic sectors in determining the health impacts and considerations of a country, and it is only through this integrated approach that AMR can be solved. During the 2011 World Health Assembly, the WHO endorsed the 6-point policy package as part of its Global Action on AMR to which the Philippines committed to during the regional committee meeting in the same year. It contains the following key strategies adhering to the One Health Approach:

The WHO Six-Point Policy Package against AMR:

1. Committing to a comprehensive, financed national plan with accountability and civic society engagement
2. Strengthening of surveillance and laboratory capacity
3. Ensuring the uninterrupted access to essential medicines of assured quality
4. Regulation and promotion of rational use of medicines, including in animal husbandry, and ensuring proper patient care
5. Enhancing infection prevention and control
6. Fostering innovations and research and development for new tools
In support of this agenda, the World Health Organization-Western Pacific Regional Office (WHO-WPRO) granted technical support to the DOH to undertake a Country Situation Analysis on AMR in 2012 in the areas of policy and planning; surveillance and laboratory capacity; access to safe and quality antimicrobials; rational use of antimicrobials; infection prevention and control; and, research and development. Completion of the study in December 2012 enabled the Department of Health (DOH) to highlight essential findings and gaps on addressing AMR and heightened the formulation of an executive policy to implement a national control strategy.

In April 10, 2014, President Benigno Aquino III created the Inter-agency Committee on AMR (ICAMR) through Administrative Order (A.O.) No. 42 directing member government agencies from the health, agriculture, trade, research and local government sectors to formulate and implement a national action plan that can rationalize and streamline government efforts to combat the AMR problem. In the Sixty-Eighth World Health Assembly (WHA) last May 2015, the WHO urged its Member States to implement their proposed plans and actions, and to have in place by the Seventieth WHA, their own national action plans on AMR. In view thereof, the DOH took lead in the finalization of a National Action Plan on AMR through the ICAMR.

INTERNATIONAL COLLABORATION

With support from the WHO-WPRO, the Philippines was able to conduct a Country Situation Analysis (CSA) on AMR and developed policies to address this problem. This partnership was further strengthened with the country being chosen in the Western Pacific Region as one of the pilot sites on the implementation of antimicrobial stewardship (AMS) program in hospitals.

There are also research initiatives among the Association of the Southeast Asian Nations (ASEAN) member states wherein the Philippines is actively collaborating with the Ministry of Health Malaysia in the conduct of a rapid assessment for regulatory measures in combating AMR.

The Philippines is also part of the Asian Network for Surveillance of Resistant Pathogens (ANSORP), which is a study group of different countries in Asia in relation to AMR. Currently, the Asia-Pacific Economic Cooperation (APEC) is actively supporting this international symposium through funding and organizing its meetings to design creative solutions and policies for the surveillance and monitoring of AMR in the Asia Pacific Region. This partnership enabled the creation of an international campaign aimed to raise awareness on AMR and promote appropriate antibiotic use. The Philippines, together with Korea, Thailand and Vietnam, are the pilot sites for these strategies to be followed by future implementation in other countries.
CHAPTER 2: The Threat of Antimicrobial Resistance in the Philippines

2.1 The ARSP 2014 Annual Report

Surveillance is an important key strategy in addressing the AMR issue through providing evidence on emerging resistant pathogens in the country and guiding the selection of appropriate antimicrobial treatments based on resistance patterns. In the Philippines, this is accomplished through the Antimicrobial Resistance Surveillance Program (ARSP), which was established in 1988 by the DOH through the Research Institute for Tropical Medicine (RITM), which serves as the reference laboratory and central coordinating center conducting annual external quality assessment scheme (EQAS) for 23 sentinel sites in 14 regions of the country. The sentinel sites are mandated to implement standards for culture and susceptibility, and unusual test results or patterns are sent to the Antimicrobial Resistance Surveillance Reference Laboratory (ARSRL) monthly.

Figure 2. The ARSP Program and its 23 Sentinel Sites
The current twenty-three ARSP sentinel laboratories according to region are as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>ARSP Sentinel Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCR</td>
<td>Lung Center of the Philippines (LCP)</td>
</tr>
<tr>
<td></td>
<td>National Kidney Institute (NKI)</td>
</tr>
<tr>
<td></td>
<td>Rizal Medical Center (RMC)</td>
</tr>
<tr>
<td></td>
<td>San Lazaro Hospital (SLH)</td>
</tr>
<tr>
<td></td>
<td>Philippine General Hospital (PGH)</td>
</tr>
<tr>
<td></td>
<td>Research Institute for Tropical Medicine (RITM)</td>
</tr>
<tr>
<td></td>
<td>Santo Tomas University Hospital (STU)</td>
</tr>
<tr>
<td></td>
<td>Far Eastern University Hospital (FEU)</td>
</tr>
<tr>
<td>CAR</td>
<td>Baguio General Hospital (BGH)</td>
</tr>
<tr>
<td>Region 1</td>
<td>Mariano Marcos Memorial Medical Center (MAR)</td>
</tr>
<tr>
<td>Region 2</td>
<td>Cagayan Valley Medical Center (CVM)</td>
</tr>
<tr>
<td>Region 3</td>
<td>Jose B. Lingad Memorial General Hospital (JLM)</td>
</tr>
<tr>
<td>Region 4A</td>
<td>Batangas Regional Hospital (BRH)</td>
</tr>
<tr>
<td>Region 5</td>
<td>Bicol Regional Training and Teaching Hospital (BRT)</td>
</tr>
<tr>
<td>Region 6</td>
<td>Corazon Locsin Montelibano Memorial Hospital (MMH)</td>
</tr>
<tr>
<td>Region 7</td>
<td>Gov. Celestino Gallares Regional Hospital (GMH)</td>
</tr>
<tr>
<td></td>
<td>Vicente Sotto Memorial Medical Center (VSM)</td>
</tr>
<tr>
<td>Region 8</td>
<td>Eastern Visayas Regional Medical Center (EVR)</td>
</tr>
<tr>
<td>Region 9</td>
<td>Zamboanga City Medical Center (ZMC)</td>
</tr>
<tr>
<td></td>
<td>Zamboanga del Norte Provincial Hospital (ZPH)</td>
</tr>
<tr>
<td>Region 10</td>
<td>Northern Mindanao Medical Center (NMC)</td>
</tr>
<tr>
<td>Region 11</td>
<td>Southern Philippine Medical Center (DMC)</td>
</tr>
<tr>
<td>Region 12</td>
<td>Cotabato Medical Center (CMC)</td>
</tr>
</tbody>
</table>

The data provided by the ARSP list most of the bacterial pathogens that contribute to seven out of the ten leading causes of morbidity. It can be observed from the 5-year average (from 2004-2009 and 2010) of the ten leading causes of mortality in the country that infectious diseases are still rampant in the country, but they can be treated with the use of appropriate antimicrobials.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause</th>
<th>Number</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acute Respiratory Infection</td>
<td>1,289,168</td>
<td>1,371.3</td>
</tr>
<tr>
<td>2</td>
<td>Acute Lower Respiratory Tract Infection and Pneumonia</td>
<td>586,166</td>
<td>623.5</td>
</tr>
<tr>
<td>3</td>
<td>Bronchitis / Bronchiolitis</td>
<td>351,128</td>
<td>373.5</td>
</tr>
<tr>
<td>4</td>
<td>Hypertension</td>
<td>345,412</td>
<td>367.4</td>
</tr>
<tr>
<td>5</td>
<td>Acute Water Diarrhea</td>
<td>326,551</td>
<td>347.3</td>
</tr>
<tr>
<td>6</td>
<td>Influenza</td>
<td>272,001</td>
<td>289.3</td>
</tr>
<tr>
<td>7</td>
<td>Urinary Tract Infection</td>
<td>83,569</td>
<td>88.9</td>
</tr>
<tr>
<td>8</td>
<td>TB Respiratory</td>
<td>72,516</td>
<td>77.1</td>
</tr>
<tr>
<td>9</td>
<td>Injuries</td>
<td>51,201</td>
<td>54.8</td>
</tr>
<tr>
<td>10</td>
<td>Diseases of the Heart</td>
<td>37,559</td>
<td>40.0</td>
</tr>
</tbody>
</table>
### Table 5. Ten Leading Causes of Mortality in the Philippines, Number and Rate/100,000 Population; 5-Year Average (2005-2009) and 2010*

<table>
<thead>
<tr>
<th>Cause</th>
<th>5-Year Average (2004-2009)</th>
<th>2010*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Rate</td>
</tr>
<tr>
<td>1. Diseases of the Heart</td>
<td>88,299</td>
<td>99.4</td>
</tr>
<tr>
<td>2. Diseases of the vascular system</td>
<td>58,761</td>
<td>66.2</td>
</tr>
<tr>
<td>3. Malignant neoplasms</td>
<td>44,627</td>
<td>50.3</td>
</tr>
<tr>
<td>4. Pneumonia</td>
<td>37,665</td>
<td>42.6</td>
</tr>
<tr>
<td>5. Accidents**</td>
<td>35,005</td>
<td>39.5</td>
</tr>
<tr>
<td>6. Tuberculosis, all forms</td>
<td>25,296</td>
<td>25.6</td>
</tr>
<tr>
<td>7. Chronic lower respiratory diseases</td>
<td>21,586</td>
<td>24.4</td>
</tr>
<tr>
<td>8. Diabetes mellitus</td>
<td>20,964</td>
<td>23.6</td>
</tr>
<tr>
<td>9. Nephritis, nephrotic syndrome and nephrosis</td>
<td>12,321</td>
<td>13.9</td>
</tr>
<tr>
<td>10. Certain conditions originating in the perinatal period</td>
<td>12,257</td>
<td>13.8</td>
</tr>
</tbody>
</table>

*Note: Excludes ill-defined and unknown causes of mortality; n=12,132: 10th rank
*Reference year
**External causes of Mortality
According to the ARSP 2014 Annual Report, about 4,256 isolates were received by the ARSRL for phenotypic and genotypic confirmatory testing, and a total of 47,280 isolates were analyzed for resistance data. The most recent Clinical Laboratory Standards Institute (CLSI) references were used to classify the isolate as resistant (R). The analysis was restricted to the first isolate received per patient in the calendar year, and the data are expressed as a cumulative resistance percentage. Table 6 below summarizes their annual results from 2013-2014:

<table>
<thead>
<tr>
<th>Table 6. ARSP 2013 and 2014 Annual Report Executive Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organisms/ Antimicrobials</strong></td>
</tr>
<tr>
<td><strong>Percent Resistance 2013</strong></td>
</tr>
<tr>
<td><strong>Percent Resistance 2014</strong></td>
</tr>
<tr>
<td><strong>Other Findings (2014)</strong></td>
</tr>
<tr>
<td><strong>Streptococcus pneumoniae</strong></td>
</tr>
<tr>
<td>1. Penicillin</td>
</tr>
<tr>
<td>5%</td>
</tr>
<tr>
<td>7%(*using meningitis breakpoint)</td>
</tr>
<tr>
<td>10.3% penicillin resistance among invasive isolates</td>
</tr>
<tr>
<td>0.5% penicillin resistance among non-invasive isolates</td>
</tr>
<tr>
<td>1 confirmed report of levofloxacin-resistant S. pneumoniae</td>
</tr>
<tr>
<td>No confirmed ceftiraxone-resistant S. pneumoniae</td>
</tr>
<tr>
<td>The most common invasive serotypes were 5, 1, 4 and 6</td>
</tr>
<tr>
<td>The most common non-invasive serotypes were 3, 19 and 7</td>
</tr>
<tr>
<td><strong>Haemophilus influenzae</strong></td>
</tr>
<tr>
<td>1. Co-Trimoxazole</td>
</tr>
<tr>
<td>34%</td>
</tr>
<tr>
<td>42.8%</td>
</tr>
<tr>
<td>All ampicillin-resistant isolates tested were positive for beta-lactamase production</td>
</tr>
<tr>
<td>No reports of levofloxacin-resistant H. influenzae</td>
</tr>
<tr>
<td>2. Chloramphenicol</td>
</tr>
<tr>
<td>6.6%</td>
</tr>
<tr>
<td>13.4%</td>
</tr>
<tr>
<td>3. Ampicillin</td>
</tr>
<tr>
<td>17%</td>
</tr>
<tr>
<td>12%</td>
</tr>
<tr>
<td>4. Amoxicillin-Clavulanic Acid</td>
</tr>
<tr>
<td>10.5%</td>
</tr>
<tr>
<td>4.1%</td>
</tr>
<tr>
<td><strong>Salmonella enterica serotype Typhi</strong></td>
</tr>
<tr>
<td>1. Cotrimoxazole</td>
</tr>
<tr>
<td>&lt;2%</td>
</tr>
<tr>
<td>6.7%</td>
</tr>
<tr>
<td>Isolates have remained susceptible to first line antibiotics: ampicillin (2.9% R) and chloramphenicol (no resistant isolate)</td>
</tr>
<tr>
<td>No ciprofloxacin resistance reported</td>
</tr>
<tr>
<td>2. Nalidixic Acid</td>
</tr>
<tr>
<td>4%</td>
</tr>
<tr>
<td>8.9%</td>
</tr>
<tr>
<td><strong>Nontyphoidal Salmonella</strong></td>
</tr>
<tr>
<td>1. Ciprofloxacin</td>
</tr>
<tr>
<td>18%</td>
</tr>
<tr>
<td>21.6%</td>
</tr>
<tr>
<td>One isolate from a sentinel site in Mindanao was confirmed as ceftriaxone-resistant, but it was negative for extended-spectrum β-lactamase (ESBL) production. It was identified as S. enterica serotype Lexington</td>
</tr>
<tr>
<td>The most common serovars identified were S. enterica serotype Typhimurium and S. enterica serotype Enteritidis</td>
</tr>
<tr>
<td>2. Chloramphenicol</td>
</tr>
<tr>
<td>16%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>3. Ampicillin</td>
</tr>
<tr>
<td>56%</td>
</tr>
<tr>
<td>40%</td>
</tr>
<tr>
<td>4. Cotrimoxazole</td>
</tr>
<tr>
<td>34%</td>
</tr>
<tr>
<td>30%</td>
</tr>
<tr>
<td><strong>Shigella species</strong></td>
</tr>
<tr>
<td>(2011-2014)*</td>
</tr>
<tr>
<td>*Since there were few isolates for 2014, data from 2011-2014 were combined to obtain a reasonable statistical estimate for the resistance of the species</td>
</tr>
<tr>
<td><strong>Vibrio cholerae</strong></td>
</tr>
<tr>
<td>1. Ampicillin</td>
</tr>
<tr>
<td>67%</td>
</tr>
<tr>
<td>62.7%</td>
</tr>
<tr>
<td>Isolates have remained susceptible to first line agents such as chloramphenicol, cotrimoxazole and tetracycline with no reported resistance for the past 2 years</td>
</tr>
<tr>
<td>Neisseria gonorrhoeae</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
</tbody>
</table>
| 1. Penicillin        | 60%         | 89.1%                                                                                                                                             
| 2. Tetracycline      | 55%         | 55.3%                                                                                                                                             
| 3. Ciprofloxacin     | 74%         | 84.8%                                                                                                                                             
| Staphylococcus aureus |            |                                                                                                                                                       
| 1. Oxacillin         | 55%         | 60.3%                                                                                                                                             
| 2. Cotrimoxazole     | 14%         | 22%                                                                                                                                                
| 3. Penicillin        | 95.5%       | 95.5%                                                                                                                                             
| Methicillin-Resistant |            |                                                                                                                                                       |
| Staphylococcus aureus |            |                                                                                                                                                       |
| 1. MRSA rate         | 53.2%       | 60.3%                                                                                                                                             
| 2. Rifampicin        | 4%          | 6%                                                                                                                                                
| 3. Ciprofloxacin     | 7%          | 10.4%                                                                                                                                             
| 4. Cotrimoxazole     | 18%         | 26.1%                                                                                                                                             
| 5. Clindamycin       | 12%         | 14.5%                                                                                                                                             
| 6. Tetracycline      | 8%          | 10.5%                                                                                                                                             
| Staphylococcus epidermidis | | No confirmed reports of vancomycin or linezolid resistance | 
| 1. Penicillin        | 95%         | 95.8%                                                                                                                                             
| 2. Oxacillin         | 75%         | 78.9%                                                                                                                                             
| 3. Cotrimoxazole     | 50%         | 53.7%                                                                                                                                             
| 4. Ciprofloxacin     | 33%         | 31.5%                                                                                                                                             
| Enterococcus species |            |                                                                                                                                                       |
| 1. Ampicillin resistance among E. faecalis | 8% | 8.6%                                                                                                                                             
| 2. Ampicillin resistance among E. faecium | 69% | 72.7%                                                                                                                                             
| Escherichia coli     |            |                                                                                                                                                       |
| 1. Ampicillin        | 62%         | 81.4%                                                                                                                                             
| 2. Ampicillin-Sulbactam | 32%     | 24.6%                                                                                                                                             
| 3. Cefuroxime        | 29%         | 32%                                                                                                                                                
| 4. Ceftriaxone       | 31%         | 32.2%                                                                                                                                             
| 5. Cotrimoxazole     | 66%         | 67.7%                                                                                                                                             
| 6. Ciprofloxacin     | 43%         | 41%                                                                                                                                                
| 7. Amikacin          | 4%          | 3.9%                                                                                                                                                
| 8. Imipenem          | 2%          | 2.1%                                                                                                                                                
| Klebsiella species   |            |                                                                                                                                                       |
| 1. Amoxicillin-Clavulanic Acid | 28% | 31.4%                                                                                                                                             
| 2. Cefuroxime        | 46%         | 45.7%                                                                                                                                             
| 3. Ceftriaxone       | 40%         | 39.4%                                                                                                                                             
| 4. Amikacin          | 7%          | 6.1%                                                                                                                                                
| 5. Ciprofloxacin     | 28%         | 26.3%                                                                                                                                             
| 6. Imipenem          | 6%          | 7.6%                                                                                                                                                
| 7. Meropenem         | 7%          | 8.8%                                                                                                                                                |
In the 2014 ARSP report, the Antimicrobial Resistance Surveillance Committee (ARSC) recommended the following action points:

Table 7: Recommendations of the Antimicrobial resistance Surveillance Committee (2014)

- Infections secondary to *Streptococcus pneumoniae* can still be covered with penicillin or one of the anti-pneumococcal macrolides, although there is a need to closely monitor the changing trends of resistance among pneumococci.
- Ampicillin is no longer recommended for empiric therapy for infections secondary to *H. influenzae*. For suspected infections, beta-lactam-beta-lactamase inhibitor combinations, extended spectrum oral cephalosporins and newer macrolides are to be used.
- Empiric treatment for suspected uncomplicated typhoid fever could still consist of chloramphenicol, cotrimoxazole, amoxicillin or ampicillin. Nalidixic acid and ciprofloxacin resistance may result to treatment failures.
- Clinicians must be wary in using ciprofloxacin against Salmonella gastroenteritis since this is a self-limited disease.
- More vigilant surveillance of the resistance pattern of Shigella to the quinolones.
- Tetracycline, chloramphenicol and cotrimoxazole are still good treatment options for cholera.
- Ceftriaxone remains as empiric antibiotic for gonococcal infections, and it is highly recommended for clinicians to send specimens to improve the limited data known about *Neisseria gonorrhoeae*.
- There may be an indication to shift empiric treatment of suspected staphylococcal infections from oxacillin to alternative agents like co-trimoxazole, doxycycline, clindamycin, linezolid or vancomycin.
- Hospitals should base their treatment recommendations for the Enterobacteriaceae on their institution’s prevailing resistance patterns due to their variability.
- Prudent use of antimicrobials and comprehensive infection control measures must be implemented.
### 2.2 AMR in Animal Health

Livestock and aquaculture production in the Philippines had intensified due to high demands for food protein sources parallel to the continuous growth of human population. The use of antimicrobials in animals is important to control the morbidity and mortality due to pathogen associated diseases in livestock. Agricultural and aquacultural practices have improved and increased animal production, but also resulted in the increase of antibiotic resistant pathogens which poses threat to both human and animal health. Inappropriate use of amount of antimicrobials resulted to antimicrobial resistance.

There are three (3) government agencies involved in the regulation of veterinary drugs particularly antimicrobials, in the country. These are the Bureau of Animal Industry (BAI) and Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture (DA) and the Food and Drug Administration (FDA) of the Department of Health (DOH).

The FDA, pursuant to Republic Act No. 9711 or the “Food and Drug Administration Act of 2009”, is mandated to regulate and monitor establishments and products including veterinary drugs and other health-related products. By virtue of the Joint DA-DOH Administrative Order No. 2013-0026, “Rules on the Regulation of Veterinary Drugs and Products, Veterinary Biological Products, and Veterinary Drugs Establishments”, FDA shall continue to register veterinary drugs in pharmaceutical dosage forms except those intended for feeds and issue license to establishments for the manufacture, distribution, importation, exportation and sale of the same. The BAI, on the other hand, shall continue to register veterinary drugs and products, veterinary biological products intended solely for animal use and issue license to establishments for the manufacture, distribution, importation, exportation and sale of the same.

RA 10611 or the “Food Safety Act of 2013”, mandates DA Food Safety Regulatory Agencies namely the Bureau of Animal Industry (BAI), National Meat Inspection Service (NMIS), Bureau of Fisheries and Aquatic Resources (BFAR) and National Dairy Authority (NDA), to be responsible for the health of animals from where food is derived and the effects of feeds and other production inputs on otherwise healthy animals.

Other initiatives on the livestock and aquaculture sector related to AMR include the current effort of the government in improving trade and competitiveness and its participation to the World Trade Organization. This movement in the government is driving the authorities to put in place programs not only in addressing AMR but also international standards to comply with the Sanitary and Phytosanitary Measures. Global practices such as the Good Animal Husbandry Practices (GAHP) and Good Aquaculture Practice (GAqP) are some of the international guidelines that are now being adapted in the country. The standards and its certification programs set out the minimum requirements for animal food production farms including traceability and documentation of veterinary drugs used.
The Philippines, as a member country of Codex, participates in the meetings of several Codex Committees where AMR is being discussed.

There are limited studies conducted by the universities and research agencies on AMR in veterinary sector. A study conducted by the College of Veterinary Medicine, University of the Philippines - Los Baños (UPLB), Los Baños, Laguna revealed AMR patterns in livestock and farm environmental/wildlife animals as indicators of the use of antibiotics in Philippine agricultural practices. In this study, the common antibiotics used in each livestock commodity were determined and evaluated for susceptibility and/or resistance to antimicrobial drugs.

In swine, the leading choices of antibiotic medication were oxytetracycline (10.9%), tiamulin (10%), penicillin (9.7%), amoxicillin (9.4%) norfloxacin (9.4%) and tylosin (8.8%). In bacterial isolation, *Pasteurella multocida, Enterococcus faecalis, Streptococcus suis* and *Bordetella bronchiseptica* were among the bacteria isolated. The antibiotic sensitivity testing showed resistance to several antibiotics namely Tylosin, Oxytetracycline and Sulfamethoxazole at 56%, 65% and 100% respectively on the *P. multocida* isolates. Both *S. suis* and *E. faecalis* were sensitive to Ampicillin, but resistant to all tested antibiotics. *B. bronchiseptica* showed sensitivity to Norfloxacin, Colistin, Ampicillin, Gentamycin and Oxytetracycline; and intermediate sensitivity to Doxycycline. However, the isolated organism showed resistance to Penicillin, Tylosin, Cephalotin, Erythromycin, Trimethoprim and Sulfamethoxazole. This study revealed that all of the isolated organisms were resistant to Tylosin and Sulfamethoxazole, while 66.7% were resistant to Oxytetracycline.

The AMR among cattle was also studied especially in animals with mastitis. Bacterial isolation revealed three (3) major groups of bacteria namely Enterobacteriacea (*E.coli and K. pneumonia*), Gram negative (*Brevundimonas diminuta, Flavimonasoryzi habitans, Acinetobacter baumanii, Vibrio metschnikovii and Pantoea agglomerans*) and Gram positive cocci/rods. Antibiotic sensitivity results showed that most resistant isolates belong to Enterobacteriacea and other Gram negative group. Narrow spectrum beta-lactam antibiotics were found ineffective on majority of the isolates while consistent sensitivity were seen from Fluoroquinolone. The most multi-resistant isolates were *B. diminuta* (resistant to 75% of antibiotics), *K. pneumonia* (resistant to 25-75% of antibiotics) and *A. baumanii* (resistant to 58.33% of antibiotics). A separate analysis was also conducted to evaluate the resistance and/or susceptibility to antimicrobial drugs among bacteria isolated from the cattle in the university farms (UPLB). The *Staphylococcus spp.* and *Bacillus cereus* showed the highest resistance and the majority of isolates were resistant to Cefaclor (46.7%). The *B. cereus* showed 71.4% resistance to Cefaclor and showed highest resistance to Trimethoprim/ Sulfonamide (TMPS) at 64.3% and Amoxicillin at 92.9%. Majority of the isolates from mastitis cases were resistant to Penicillin and Ampicillin at 57.6% and 59.8%, respectively while only 50% were susceptible to TMPS.
The use of antibiotic as growth promoters has also been reflected in isolated *Campylobacter jejuni* from the Philippine broilers. The isolates showed multi resistance to more than 7 antibiotics tested, presenting at least 8 multiple resistance patterns. Lowest level of resistance was observed for erythromycin at 33.3%. Resistance to all antibiotics was observed for two isolates from chickens of commercial producers.

Another study was conducted by Sison et al. (2014) to determine the prevalence and to semi-quantify the *Campylobacter spp.* on chicken meat samples collected at 4 local wet markets in Nueva Ecija, and to determine the AMR patterns of the *Campylobacter* isolates. This study revealed 77.3% resistance to Ampicillin, followed by Ciprofloxacin (70.4%), Tetracycline (54.6%), Erythromycin (20.2%) and Gentamycin (11.4%).

A study conducted at Philippine Carabao Cneter (PCC) together with College of Veterinary Medicine and Science of the Central Luzon State University (CLSU) detected the presence of plasmids or genes (Sul 1 and Tet M) in isolated bacteria causing resistance to Sulfonamide and Tetracycline, respectively. These bacteria were isolated from the respiratory tract of the animals.

Based on the literature review of the 2013 CSA-AMR report, research studies examining the presence of AMR from live and slaughtered pigs, chickens, eggs and milk of cattle from 1998-2012, revealed that 100% of the isolates are resistant to tetracycline. Other alarming antimicrobials include trimethoprim-sulfamethoxazole, penicillin, ampicillin and chloramphenicol. *E. coli* has excessive resistance to antimicrobials, while more than 90% isolates exhibited multiple drug resistance.

A study conducted by Ciceron et al. in 2005, concluded that the high resistance rates of isolates were attributed to the use of antibiotics in feeds in the farm. Morales in 2000 also revealed that antibiotic residues in animals increased AMR and allergic reactions to antibiotics in humans.

Current research at the College of Veterinary Medicine and Science of the Central Luzon State University (CLSU) aims to identify the antimicrobial classes/families to which pathogens in swine and poultry have developed resistance, identify AMR causing genes from bacterial pathogens, determine the prevalence of AMR, and assess the risk associated with AMR. This research is being funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD).

From these, much work is still needed in elucidating the magnitude and status of AMR in the country. Different activities and researches regarding AMR on animal are currently conducted in line with the WHO/FAO/OIE action against AMR. The current developments in the government and collaborations with international organizations will help in pursuing the needed steps in improving the work on AMR in the veterinary sector.
CHAPTER 3: The Inter-Agency Committee on Antimicrobial Resistance (ICAMR): Roles and Mandate

The readiness of a country to overcome the AMR challenge is reflected through three important factors: (1) the availability of a comprehensive and sustainable national action plan; (2) the presence of an established national coordinating body; and, (3) the existence of policies that serve as guides for frameworks of action.

Cognizant of the public health threats of AMR to both humankind and animal health, with consequences affecting various sectors, President Benigno Aquino III, in 2014, passed the A.O. 42, which orders the creation of a multisectoral body focused on establishing mechanisms to integrate all initiatives into a single concerted action plan called as the Inter-Agency Committee on AMR (ICAMR).

<table>
<thead>
<tr>
<th>ADMINISTRATIVE ORDER NO. 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATING AN INTER-AGENCY COMMITTEE FOR THE FORMULATION AND IMPLEMENTATION OF A NATIONAL PLAN TO COMBAT ANTIMICROBIAL RESISTANCE IN THE PHILIPPINES</td>
</tr>
</tbody>
</table>

**WHEREAS**, antimicrobial resistance (AMR) has been identified by the World Health Organization (WHO) and the World Organization on Animal Health, as well as other policymakers, scientists, professionals, and civil society groups, as a global threat to humankind and animal health because it reduces the effectiveness of antimicrobial medicines;

**WHEREAS**, AMR has serious health and economic consequences, such as increased mortality, prolonged illness, increased cost of health care, and adverse impact on trade and foreign affairs;

**WHEREAS**, there is a need to ensure efficient government response to control AMR through the formulation, adoption, and implementation of a comprehensive national plan that would integrate, coordinate, and develop sustainable and collaborative systems and mechanisms to combat AMR in the Philippines;

**WHEREAS**, the creation of an inter-agency committee to formulate and implement the plan can rationalize, harmonize, streamline, integrate, and unify the efforts of government agencies to address the AMR problem; and

**WHEREAS**, the Philippines has committed to the WHO Six-Point Health Policy Agenda as a response to the efforts to control and prevent AMR.

**NOW, THEREFORE, I, BENIGNO S. AQUINO III**, President of the Philippines, by virtue of the powers vested in me by law, do hereby order:

**SECTION 1. Creation and Composition.** The Inter-Agency Committee (hereinafter referred to as the Committee) is hereby created, to be composed of representatives from the following:

**Co-Chairs:**
- Department of Health (DOH)
- Department of Agriculture (DA)

**Members:**
- Department of Science and Technology (DOST)
- Department of the Interior and Local Government (DILG)
- Department of Trade and Industry (DTI)

DOH shall provide secretariat support to the Committee.

The Committee may call upon any department, bureau, office, agency, or instrumentality of the government, and request the local government units and private sector for assistance as the circumstances and exigencies may require.
The duly authorized representatives of the member-agencies of the Committee shall have a rank not lower than Assistant Secretary.

SECTION 2. Functions. The Committee shall have the following functions:

a) Formulate, develop and implement and oversee the national plan for the prevention and control of AMR;

b) Collaborate and coordinate with other agencies of the Executive branch and private and non-government sectors;

c) Promulgate guidelines, rules and regulations, as well as possible penalties and sanctions for violations in accordance with existing laws, as may be necessary, related, incidental, or consistent with the purpose, intent, and objective of this Order;

d) Submit to the office of the President regular status reports on the implementation of the national plan; and

e) Perform such other functions and activities as may be necessary to carry out the provisions of this Order, or as the President may direct.

SECTION 3. Development of the National Plan. A comprehensive and sustainable plan to combat AMR in the country shall be developed which will include, but not be limited to the following:

a) Establishment of short and long term programs to address the different aspects of response to AMR, including advocacy, management of AMR and the regulation of antimicrobial use;

b) Strengthening the surveillance system and laboratory detection capacity for AMR and its use in humans and animals;

c) Ensuring accessibility, affordability, availability, and quality of antimicrobial drugs for humans, as well as their rational use in humans, food producing animals and aquaculture;

d) Guaranteeing that antimicrobial agents are prescribed, dispensed, promoted, advertised and used according to the licensed indication;

e) Development of relevant and utilizable essential medicines list for human and veterinary use;

f) Institutionalization of infection prevention and control in healthcare and veterinary facilities and the community through training and education; and

g) Conduct of research towards the development of new antimicrobials and innovative technologies to improve diagnosis and treatment

SECTION 4. Funding. The member-agencies of the Committee are authorized to charge against their current appropriations such amounts as may be necessary for the implementation of this Order, subject to the budgetary, accounting and auditing rules and regulations. Subsequent funding requirements shall be incorporated in the annual budget proposals of the respective member-agencies through the General Appropriations Act (GAA). Additional funds and possible fund sources as may be necessary for the implementation of this Order shall be identified and provided by the DBM.

Section 5. Separability Clause. Should any provision of this Order be declared invalid or unconstitutional, the other provisions unaffected thereby shall remain valid and subsisting.

Section 6. Repealing Clause. All orders, proclamations, rules, regulations or parts thereof, which are inconsistent with any of the provisions of this Order are hereby repealed or modified accordingly.

Section 7. Effectivity. This Order shall take effect immediately.

DONE, in the City of Manila, this 10th day of April, in the year of Our Lord, Two Thousand and Fourteen.

By the President:

PAQUITO N. OCHOA, JR.
Executive Secretary
As the lead national agencies, the DOH and DA are delegated as Co-Chairs of the ICAMR. The DOH primarily functions to provide technical secretariat support to the committee. Together with the DA, they are both responsible for establishing policies that address AMR, and to ensure that antimicrobials of quality are accessible and affordable for Filipinos. They are also tasked to regulate these agents in the market, and to create essential medicines lists, treatment guidelines, systems, platforms, risk communication plans and IEC materials for both human and veterinary use. As regards to monitoring and evaluation functions, these two agencies are also mandated to establish AMR and antimicrobial use surveillance programs.

The DOST, DILG and the DTI are mandated to participate as members of the ICAMR. The main participation of the DTI is in the strengthening of the surveillance systems and laboratory detection capacity for AMR and its use in humans and animals by ensuring that facilities conform to international standards. The DOST functions to take lead in the prioritization of AMR in health agendas and researches aimed to develop new antimicrobials and innovative technologies to improve diagnosis and treatment. On the other hand, the DILG is responsible for the coordination and implementation of AMR policies to the local governments to ensure that strategies to address AMR reach communities and household level.
CHAPTER 4: The Philippine Action Plan to Combat AMR: One Health Approach

The complex issue on AMR warrants a multi-sectoral intervention not only to contain the increasing drug resistance of bacterial pathogens as provided by the ARSP data, but more importantly, to assure the safety of both humans and animals in the country. The “Philippine Action Plan to Combat AMR” serves as the country roadmap towards containing, controlling and preventing AMR which provides an intervention strategy in order to facilitate the mechanisms of combating the growing problem of AMR as one nation through political commitment and leadership, institutionalizing integrated surveillance systems, regulating access to quality antimicrobials, rational use of antimicrobials, establishing measures to prevent and control further spread of AMR, and strengthening research and development initiatives. This comprehensive plan emphasizes the “One Health Approach” as it recognizes that the causation of AMR is inter-related and inter-sectoral thereby requiring collaborative multidisciplinary work at local, national, and global levels to attain optimal health for humans, animals and the environment.

### Vision

A nation protected against the threats of antimicrobial resistance

### Mission

To implement an integrated, comprehensive and sustainable national program to combat AMR geared towards safeguarding human and animal health while preventing interference in the agricultural, food, trade, communication and environmental sectors

### Philippine Targets to Combat Antimicrobial Resistance

**By 2020, the Philippines will:**

1. Reduce by 30% carbapenem-resistant Enterobacteriaceae (E. coli and Klebsiella) infections acquired during hospitalization

2. Maintain the prevalence of ceftriaxone-resistant Neisseria gonorrhoeae to 0%

3. Reduce by at least 30% overall methicillin resistance in Staphylococcus aureus bloodstream infections compared to rates in 2014

4. Reduce by 30% multidrug-resistant Pseudomonas spp infections acquired during hospitalization compared to estimates in 2014

5. Reduce by 25% ciprofloxacin-resistant non-typhoidal salmonella infections compared to 2014
**Key Strategy 01:**
Commit to a comprehensive, financed national plan with accountability and civic society engagement

**Human Health**

The critical role of the Philippine government is to lead and consolidate the fragmented efforts by individual programs or institutions through the creation of a National Action Plan and by providing them policies and a legal framework towards the main goal of combating AMR in the country. The recognition of this problem is not only expected from the different government departments, but also from the private and non-governmental sectors. A commitment from all these stakeholders would allow for various targets to be reached simultaneously, and for more resources to be generated. In order for this to be possible, an effective assessment of costs and potential savings from the reduction of AMR must also be in place. Moreover, the government needs to collaborate with the civil societies to raise awareness and disseminate information about the rising AMR issue to the public properly.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To forge a joint action plan and agreement among national agencies</td>
<td>Convening of ICAMR to consolidate the AMR plans from concerned agencies</td>
<td>2014 – Q3</td>
<td>National Action Plan on AMR</td>
<td>DOH (PD)</td>
<td>250,000</td>
</tr>
<tr>
<td></td>
<td>Briefing of DOH Execom members on concerned agencies on AMU and AMR issues</td>
<td>2015</td>
<td>Briefing and presentation</td>
<td>DOH (PD), ICAMR</td>
<td></td>
</tr>
<tr>
<td>To generate resources and enhance internal and external networking</td>
<td>Submission of project proposals to international organizations or relevant funding agencies</td>
<td>2015 onwards</td>
<td>Approved project; grant; funding agreement</td>
<td>ICAMR</td>
<td>None</td>
</tr>
</tbody>
</table>
**Animal Health**

Following the One Health Approach, the animal sector, likewise, must play a role in the judicious use of antimicrobials. The transmission of AMR in both domestic and wild animals across different environments and geographic distances warrants a continuous collaboration with the Department of Agriculture. The ecology of AMR has long been present in both the soil and water microbiomes, such that streamlining efforts with other partner-agencies not only enables increased mobilization of resources, but also a better foundation to address knowledge gaps about AMR, especially in the veterinary health sector.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
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<tr>
<td>To forge a joint action plan and agreement among national agencies</td>
<td>Information dissemination on A.O. No. 42 among concerned DA agencies</td>
<td>2014 – Q2</td>
<td>DA Memorandum</td>
<td>DA (OSEC)</td>
<td>150,000.00</td>
</tr>
<tr>
<td></td>
<td>Identification of official and alternate representatives for the ICAMR</td>
<td>2014-Q3</td>
<td>Endorsement Letter from DA-OSEC to DOH</td>
<td>DA (OSEC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approval of Special Order for the creation of DA TWG to consolidate the AMR plan</td>
<td>2014-Q3</td>
<td>Approved Special Order; Endorsement of AMR plan</td>
<td>DA (ASEC on Livestock; NMIS as Secretariat)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To generate resources and enhance internal and external networking</td>
<td>Submission of project proposals to international organizations/relevant funding agencies</td>
<td>2015-onwards</td>
<td>Approved project; grant; funding agreement</td>
<td>ICAMR</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Lobbying for budget (GAA, Sin Tax, International Partners, WHO)</td>
<td>2014-2015</td>
<td>Approved GAA; MOA/ MOU</td>
<td>ICAMR member agencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Budget proposal for continuous appropriations in GAA</td>
<td>2015 onwards</td>
<td>Approval of GAA for DA</td>
<td>DA member agencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Submission of project proposals to international organizations/relevant funding agencies</td>
<td>2015</td>
<td>Approved project; grant; funding agreement</td>
<td>DA member agencies</td>
<td></td>
</tr>
</tbody>
</table>
**Key Strategy 02:**
**Strengthen surveillance and laboratory capacity**

*Human Health*

Establishing surveillance systems on monitoring resistant pathogens as well as the consumption of antimicrobials plays a very significant role in developing evidence-based policies to control/limit overuse of antimicrobials which was identified as a major contributory factor to the emergence of AMR, in designing effective guidelines for feedback and control mechanisms on addressing AMR outbreaks in the country. Empowering and increasing the skills set of health professionals and laboratories that take part in the process of surveillance enable reliable and robust diagnostic testing and proper data to be reported. With proper information and sharing of surveillance studies across borders, targeted approaches and treatment strategies may be developed to limit the spread and emergence of pathogens with AMR.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To improve the surveillance capacity of health personnel, hospitals and laboratories</td>
<td>Assessment and inventory of resources for monitoring, surveillance and testing (including Price Reference of Laboratory supplies and equipment)</td>
<td>2015</td>
<td>A design for the upgrading of laboratories for AMR and drug residue testing and manual for biosafety and biosecurity harmonized to DOH guidelines</td>
<td>DOH (FDA) and DTI</td>
<td>None</td>
</tr>
<tr>
<td>Foreign and local training of technical personnel on monitoring, surveillance and testing methods and the operation of laboratories, including compliance to accreditation standards (PNS ISO/IEC 17025, PNS ISO 15189, PNS ISO/IEC 17020, Codex)</td>
<td>Foreign and local training of technical personnel on monitoring, surveillance and testing methods and the operation of laboratories, including compliance to accreditation standards (PNS ISO/IEC 17025, PNS ISO 15189, PNS ISO/IEC 17020, Codex)</td>
<td>2015</td>
<td>Technical personnel able and qualified to handle surveillance, monitoring and testing of samples for AMR. A manual of policies and procedures for the design/implementation/upgrading of surveillance and monitoring programs</td>
<td>DOH and DTI</td>
<td>50,000,000</td>
</tr>
<tr>
<td>Management of the National Health Laboratory Referral Network (DOH A.O. No. 2012-0021)</td>
<td>Management of the National Health Laboratory Referral Network (DOH A.O. No. 2012-0021)</td>
<td>2015-2016</td>
<td>Government and private laboratories licensed by DOH (starting with levels 2 and 3 hospitals) apply and qualify for membership to the National Health Laboratory</td>
<td>DOH (HFDB) The role of HFDB is to advocate for and help establish Regional Laboratory Networks/ Councils (A.O. No. 2014-0006) It is the Reg Lab Network</td>
<td>800,000</td>
</tr>
<tr>
<td>Objective</td>
<td>Activity</td>
<td>Year</td>
<td>Expected Outcome</td>
<td>Responsible Bodies</td>
<td>Budget</td>
</tr>
<tr>
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</tr>
<tr>
<td>Strengthen the implementation of Hospital-Acquired Infection (HAI) surveillance in hospitals thru conduct of trainings of ICC chairs and nurses</td>
<td>2015</td>
<td>A system of notification and alert for HAI thru NEC; Protocols for centralized reporting and feedback; Training manuals for reporting system; Protocols for centralized reporting and feedback; Training manuals for reporting system</td>
<td>DOH (HFDB, HFSRB and EB)</td>
<td>5,000,000</td>
<td></td>
</tr>
<tr>
<td>Expansion of ARSP to DOH-retained hospitals</td>
<td>2016</td>
<td>Number of sentinel sites</td>
<td>DOH (RITM)</td>
<td>30,000,000</td>
<td></td>
</tr>
<tr>
<td>To develop programs and systems for surveillance and monitoring of AMR</td>
<td>Development of a surveillance system for antimicrobial use (AMU)</td>
<td>2015</td>
<td>Annual AMU report</td>
<td>DOH (PD)</td>
<td>7,000,000</td>
</tr>
<tr>
<td>Development of an integrated system for AMR, AMU and HAI</td>
<td>2015-2016</td>
<td>Annual integrated report on AMU, AMR and HAI</td>
<td>DOH (PD, RITM, EB, HFSRB and HFDB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of an IT platform to communicate data on AMR to stakeholders</td>
<td>2015-2016</td>
<td>AMR Dashboard</td>
<td>DOH (RITM, PD, and EB)</td>
<td></td>
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</tr>
</tbody>
</table>
**Animal Health**

The impact of AMR in the agricultural sector is not yet well comprehended, and this substantiates the need for an improvement in the current state and evolution of AMR trends in animal health. It is known that the judicious use of antimicrobials in food-producing animals is a critical step in lessening the AMR patterns seen in human medicine, so it is essential for an effective monitoring system to be in place from the point of slaughter to processing of animals, as well as the implementation of surveillance systems focusing on AMR mitigation strategies in animals.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To improve the capacities of health personnel, hospitals and laboratories</td>
<td>Identification of DA national and regional laboratories that for AMR surveillance and monitoring</td>
<td>2015 onwards</td>
<td>Designated AMR laboratories</td>
<td>DA (BAI)</td>
<td>60,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Assessment and inventory of resources for monitoring, surveillance and testing</td>
<td>2015</td>
<td>A design for the upgrading of AMR laboratories</td>
<td>DA (BAI) and DTI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hiring of additional personnel</td>
<td>2015</td>
<td>Approved Job Order; Contract for hired JO</td>
<td>DA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign and local training of technical personnel on monitoring, surveillance and testing methods and the operation of laboratories including compliance to accreditation standards (PNS ISO/IEC 17025, PNS ISO 15189, PNS ISO/IEC 17020, Codex)</td>
<td>2015</td>
<td>Technical personnel able and qualified to handle surveillance, monitoring and testing of samples for AMR</td>
<td>DA and DTI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improvement of faciities and purchase of necessary equipment and laboratory supplies, glassware, culture media, reagents of test kits, etc. for AMR laboratories</td>
<td>2015-2016</td>
<td>Upgraded laboratories with required equipment</td>
<td>DA</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Year</td>
<td>Description</td>
<td>Department</td>
<td>Budget</td>
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<tr>
<td>----------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>To develop programs and systems for surveillance and monitoring of AMR.</td>
<td></td>
<td>Development of surveillance and monitoring system for AMR and AMU in food-producing animals.</td>
<td>DA (BAI and BFAR)</td>
<td>5,000,000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Manual of procedures and harmonized standards; AMR/AMU reports in animal species; Protocols for reporting system and feedback system.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Data collection/sampling/testing/ analysis of Drug Residue in animals (focus on AMR) - for clarification of DA.</td>
<td>DA (BAI and BFAR)</td>
<td>25,000,000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Data collected / samples tested / analyzed and results reviewed. A report on the occurrence of AMR in animal species and production practices relevant to the emergence of AMR.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Sampling and testing analysis for antibiotic susceptibility testing based on internationally accepted standards.</td>
<td>DA (BAI and BFAR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Reports on AMR in animal species.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Monitoring of AMR and AMU trends in food-producing animals.</td>
<td>DA (BAI and BFAR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2015 onwards</td>
<td>Regular dissemination of reports on AMR in animal species.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Key Strategy 03:**
Ensure uninterrupted access to essential medicines of assured quality

**Human Health**

Taking substandard or counterfeit antimicrobials containing less than the specified amount of the active ingredient, or consuming suboptimal dosage due to lack of supply or limited accessibility to antimicrobials contributes to the overall AMR problem because infections persist and resistant microbes are able to grow and survive the treatment. Ensuring sustainable access to quality essential antimicrobials is therefore integral in successfully hampering the development of AMR. This is made possible primarily by strengthening the regulatory measures, tools and activities of the national drug regulatory agency in ensuring the safety, efficacy and quality of medicines from market authorization to post-marketing surveillance. Efforts must also focus on sustaining an efficient supply chain system towards ensuring the availability or accessibility of quality medicines to all patients at all times, with emphasis on completing the course of treatment.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To improve the registration, marketing authorization and post-marketing surveillance of antimicrobials</td>
<td>Monitoring the quality of registered antimicrobials in the market</td>
<td>2015 onwards</td>
<td>PMS report on the quality of registered antimicrobials and the presence of unregistered antimicrobials</td>
<td>DOH (FDA)</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Process streamlining of review and release of marketing authorization of new antibiotics that address priority infectious diseases in the country</td>
<td>2014 onwards</td>
<td>Protocols for facilitated processes of review and marketing authorization of new antibiotics available in websites; issuance of certificate of product registration, license to operate for antimicrobials and importation clearance</td>
<td>DOH (FDA) and DA (BFAR and OPP)</td>
<td>8,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Forging an agreement on regulatory control over drugs used in aquaculture</td>
<td>2015</td>
<td>Approved joint AO including sanctions on products with positive antibiotic residues</td>
<td>DOH (FDA) and DA (BFAR)</td>
<td>None</td>
</tr>
</tbody>
</table>
### Animal Health

The local demand for safe food products such as milk, meat, fish and eggs, is currently dependent on antimicrobial agents, such that micro-organisms are not acquired by people, who consume them. Regulatory agencies, therefore, must be able to implement quality control mechanisms, and have them in place so that AMR is not worsened.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Timeframe</th>
<th>MOA/MOU</th>
<th>DOH/FDA and PD</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationalization and harmonization of regulatory control over the manufacture and use of antibiotics in animals</td>
<td>2015</td>
<td>Agreed policy between DA and DOH; Enactment of Animal Industry and Veterinary Services Act (AIVSA)</td>
<td>DOH (FDA) and DA (BFAR)</td>
<td></td>
</tr>
<tr>
<td>To ensure access to essential medicines</td>
<td>2015-2016</td>
<td>MOA/MOU</td>
<td>DOH (FDA and PD)</td>
<td>None</td>
</tr>
<tr>
<td>Review of issuances related to access to antimicrobials, especially in the distribution and sale in drug outlets</td>
<td>2015-2016</td>
<td>Reports; Minutes of the Meeting</td>
<td>DOH (FDA and PD)</td>
<td></td>
</tr>
<tr>
<td>Strict enforcement of regulations on antibiotic prescription, dispensing and use</td>
<td>2014 onwards</td>
<td>Monitoring reports</td>
<td>DOH (FDA)</td>
<td></td>
</tr>
<tr>
<td>Mainstreaming of complete treatment regimen thru reimbursement schemes</td>
<td>2015</td>
<td>PHIC reimbursement package</td>
<td>DOH (FDA, PHIC and PD)</td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td>Activities</td>
<td>Timeline</td>
<td>Measurement</td>
<td>Responsible Agency</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>To improve the registration, marketing authorization and post-marketing surveillance of antimicrobials</td>
<td>Process streamlining of review and release of marketing authorization of new antibiotics that address priority infectious diseases in the country</td>
<td>2014 onwards</td>
<td>Protocols for facilitated processes of review and marketing authorization of new antibiotics available in websites; issuance of certificate of product registration, license to operate for antimicrobials and importation clearance</td>
<td>DOH (FDA) and DA (BAI), BFAR and CPP</td>
</tr>
<tr>
<td></td>
<td>Development of a database of registered antimicrobials, including quantitative production and importation</td>
<td>2015 onwards</td>
<td>Database available in websites</td>
<td>DA (BAI and BFAR) and DOH (FDA)</td>
</tr>
<tr>
<td></td>
<td>Quality monitoring of veterinary drugs</td>
<td>2015 onwards</td>
<td>Quality Reports</td>
<td>DA (BAI and BFAR) and DOH (FDA)</td>
</tr>
<tr>
<td></td>
<td>Monitoring of use of unregistered antimicrobials in animals</td>
<td>2015 onwards</td>
<td>Monitoring reports on use of unregistered antimicrobials</td>
<td>DA (BAI and BFAR) and DOH (FDA)</td>
</tr>
<tr>
<td></td>
<td>Forging an agreement on regulatory control over drugs used in aquaculture</td>
<td>2015</td>
<td>Approved joint AO including sanctions on products with positive antibiotic residues</td>
<td>DOH (FDA) and DA (BFAR)</td>
</tr>
<tr>
<td></td>
<td>Rationalization and harmonization of regulatory control over the manufacture and use of antibiotics in animals</td>
<td>2015</td>
<td>Agreed policy between DA and DOH; Enactment of Animal Industry and Veterinary Services Act (AIVSA)</td>
<td>DOH (FDA) and DA (BFAR)</td>
</tr>
<tr>
<td>To ensure access to essential medicines</td>
<td>Forging of partnership with healthcare professionals, organization, and consumer groups</td>
<td>2015-2016</td>
<td>MOA/MOU</td>
<td>DA (BAI and BFAR)</td>
</tr>
<tr>
<td></td>
<td>Review of issuances related to access to antimicrobials, especially in the distribution and sale in drug outlets</td>
<td>2015-2016</td>
<td>Reports; Minutes of the Meeting</td>
<td>DA (BAI and BFAR)</td>
</tr>
<tr>
<td></td>
<td>Strict enforcement of regulations on antibiotic prescription, dispensing and use</td>
<td>2015 onwards</td>
<td>Monitoring reports</td>
<td>DA (BAI and BFAR)</td>
</tr>
</tbody>
</table>
**Key Strategy 04:**
*Regulate and promote the rational use of medicines in the human and animal health sectors*

**Human Health**

While AMR is a natural phenomenon in microbes that happen as an adaptation to external threats, humans have definitely hastened it. The WHO has identified irrational use or misuse of antimicrobial medicines as a major driver of AMR, which is associated with a variety of management and healthcare provider concerns. Misinformation, lack of information dissemination and existence of proper guidelines and training of health care providers all lead to improper dispensing, prescription and treatment. Advertisements and other tools being used to promote drugs merely for profit without taking into considering its ill-side effects further lead to worsening AMR consequences. Community purchases are often times made without prescriptions. There is significant relationship between the unit cost of drugs and patient compliance, proving that the socioeconomic status of the patient remains to be a cause of therapy problem. Cognizant of the above pervasive inappropriate and irresponsible practices contributing to the over-all burden of AMR, it is therefore imperative that concerted actions must be focused on institutionalizing rational use of antimicrobials among the healthcare providers and the patients.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To foster an enabling environment for the rational use of medicines</td>
<td>Strict regulation of promotion and marketing of antimicrobials for human and veterinary use</td>
<td>2015 onwards</td>
<td>Public advisories, advertisements, policies and standards</td>
<td>DOH (FDA and PD) and DA (BAI)</td>
<td>16,500,000.00</td>
</tr>
<tr>
<td>Institutionalization of Philippine Practice Standards for Pharmacists (PhilPSP) in relation to Rational Dispensing of Antimicrobials</td>
<td>2015</td>
<td>Training manuals and conduct of trainings for pharmacists on rational dispensing of antimicrobials</td>
<td>DOH (FDA and PD)</td>
<td>16,500,000.00</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Timeframe</td>
<td>Description</td>
<td>Responsible Agency(s)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Development of National Antibiotic Guidelines for hospitals and primary health care facilities</td>
<td>2015-2016</td>
<td>National Antibiotic Guidelines disseminated to health facilities</td>
<td>DOH (PD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of Antimicrobial Stewardship Program (AMS) in hospitals</td>
<td>2015-2016</td>
<td>Development of policy for AMS implementation in hospitals, Training materials for implementing ASP, Conduct of pilot implementation in 8 hospitals</td>
<td>DOH (PD, DPCB and HFDB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inclusion of RUM principles in health education components of school curricula and adult education programs and in the Continuing Professional Education (CPE) of health professionals</td>
<td>2015-2016</td>
<td>RUM modules integrated in primary, secondary and tertiary education</td>
<td>ICAMR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development/Updating treatment guidelines for specific diseases</td>
<td>2015</td>
<td>National Treatment Guidelines developed</td>
<td>DOH (DPCB and PD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training/Dissemination of the National Treatment Guidelines</td>
<td>2015</td>
<td>Number of trained personnel</td>
<td>DOH (DPCB and PD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct of coordination meetings and workshops for implementation of policies with local governments</td>
<td>2015 onwards</td>
<td>Minutes of Meeting; agreements</td>
<td>DA (BAI, BFAR and OPP), DOH and DILG</td>
<td>Incorporated in the Key Strategy 04 of Animal Health</td>
<td></td>
</tr>
</tbody>
</table>
**Animal Health**

The existing regulatory frameworks concerning the use of antimicrobials in the animals are lacking and not properly enforced. These systems need to be strengthened to potentially create an impact on the resistance levels in the country. Immense quantities of antibiotics are consistently used for growth promotion and disease prevention in animals, and have significantly higher values compared to usage of humans for various illnesses. It is necessary to have a rational use of antimicrobials in place so that wastes containing drug residues from large-scale animal farms and aquaculture are minimized. These are potential sources for AMR genes and antibiotic pollution in the environment, and are considered to be major factors in the heightened AMR found in the animal sector.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
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<th>Responsible Agency</th>
<th>Budget (PhP)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>To foster an enabling environment for the rational use of medicines</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Review of existing regulations and regulatory controls for registration,</td>
<td>2015 onwards</td>
<td>Status report on the strengthening of various regulations for veterinary</td>
<td>DA (BAI, BFAR and OPP)</td>
<td>5,000,000.00</td>
</tr>
<tr>
<td></td>
<td>advertising, importation and end use</td>
<td></td>
<td>drugs; compendium of relevant laws, AOs and circulars</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Continuous monitoring of banned antimicrobials</td>
<td>2015 onwards</td>
<td>Publication of banned drugs; status reports</td>
<td>DA (BAI)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved implementation of Policy on Prescribing and Dispensing of</td>
<td>2015 onwards</td>
<td>Compliance report</td>
<td>DA (BAI, BFAR and OPP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Veterinary Drugs (VDO)</td>
<td></td>
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<tr>
<td></td>
<td>Conduct of dialogue/meeting with clients, stakeholders, industry</td>
<td>2015 onwards</td>
<td>Minutes of Meeting; agreements</td>
<td>DA and DOH (FDA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Training on international standards of consumer products</td>
<td>2015 onwards</td>
<td>Number of trained personnel</td>
<td>DA and DOH (FDA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creation of a “Veterinary Formulary Executive Council”</td>
<td>2015 onwards</td>
<td>Issued Special Order</td>
<td>DA and DOH (FDA)</td>
<td></td>
</tr>
</tbody>
</table>
**Key Strategy 05:**
Enhance infection prevention and control across all settings

**Human Health**

Because AMR reduces the effectiveness of the antimicrobial treatment thereby prolonging patient illnesses and increasing the risk of spreading resistant microorganisms to others, establishing Infection Prevention and Control (IPC) interventions in healthcare settings is crucial. IPC practices and guidelines not only ensure containment of infection and minimization of the occurrences of outbreaks, but also enable the reduction of diseases that require further use of antimicrobials. Ultimately, patient outcomes improve and overall treatment costs are reduced. IPC practices include basic hand hygiene, aseptic practices, environmental and waste management and the proper placement of patients with known or suspected diseases in their respective emergency, inpatient, ambulatory, medical, surgical or outpatient settings. Drug resistance does not only occur in the healthcare settings, but also at the household level. IPC, with proper training of health personnel and education in the community level, is therefore needed to combat AMR.
**Animal Health**

It has been found by the European Food Safety Authority (EFSA) that some resistant strains found in human diseases, such as *Campylobacter* and *Salmonella* bacteria, actually originate from farm animals. Increasing the implementation and instilling standard practices in the agricultural sector enables a broader and faster application of strategies to not only combat AMR, but also to minimize its development and impacts.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Timeline</th>
<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To implement programs on IPC</td>
<td>Implementation of Good Animal Husbandry Practices (GAHP) and Good Aquaculture Practices (GAqP) as Philippine National Standards</td>
<td>2015 onwards</td>
<td>Training sessions conducted; number of farms registered with GAHP and GAqP, Validation of codes of good practice (audits and renewal)</td>
<td>CA (BAI, BFAR)</td>
<td>10,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Strengthen animal health system capacity</td>
<td>2015 onwards</td>
<td>Workshops conducted/info materials disseminated on the implementation of relevant policies on proper use of antimicrobials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Key Strategy 06:**

**Foster innovations, research, and development**

**Human Health**

The problem of AMR causing the deterioration of the effectiveness of antimicrobials is coupled with the shrinking pipeline of new antimicrobials. With the decline of antibiotic discovery for the last decade, the WHO has emphasized that we are in race against time to develop new antibiotics. While there are several option interventions to prevent the emergence and spread of resistant infections, AMR as a natural phenomenon is inevitable; thus, new medicines and other tools to control infections will still be needed in the future. As the trend of AMR continue to rise, so should the effort in developing new health technologies escalate as well. Developing rapid diagnostic tests are important as well to better guide physicians on prescribing the appropriate antimicrobial treatment for the patients.

<table>
<thead>
<tr>
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<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To prioritize AMR in fields of research</td>
<td>Inclusion of AMR detection, prevention and control in the National Unified Health Research Agenda (NUHRA) and unified IT program on AMR to the e-health Development Plan; Engaging academic and other research institutions</td>
<td>2015</td>
<td>Mention of AMR in NUHRA and e-health development plan</td>
<td>DOST</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2016</td>
<td>MOA/MOU, research contracts, technical reports and products</td>
<td>ICAMR</td>
<td></td>
</tr>
<tr>
<td>Develop AMR research Agenda for human health</td>
<td></td>
<td>2015</td>
<td>AMR Research Agenda</td>
<td>DOH</td>
<td>23,000,000.00</td>
</tr>
<tr>
<td>Provide incentive and research funding for innovators</td>
<td></td>
<td>2016</td>
<td>Funded research projects</td>
<td>DOH and DOST</td>
<td></td>
</tr>
<tr>
<td>To disseminate scientific information relevant to AMR</td>
<td>Inventory of AMR-related researches on humans</td>
<td>2015</td>
<td>Database on local researches</td>
<td>ICAMR</td>
<td>3,000,000.00</td>
</tr>
</tbody>
</table>
**Animal Health**

The causes, effects and impacts of AMR in the animal sector entail a better and deeper knowledge of the phenomena’s complexity. Veterinary antimicrobial consumption needs be further assessed in order to determine the correlation of AMR in both animal and human health in the country. Moreover, toxicological studies need to be performed to establish the safety of veterinary drug residues in the human diet, as well in the human intestinal flora. Researches are needed to enhance the development of effective strategies and alternatives to combat AMR in food-producing animals.

<table>
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<th>Budget (PhP)</th>
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<tbody>
<tr>
<td>To prioritize AMR in fields of research</td>
<td>Inclusion of AMR detection, prevention and control in the National Unified Health Research Agenda (NUHRA) and unified IT program on AMR to the e-Health Development Plan</td>
<td>2015</td>
<td>Mention of AMR in NUHRA and e-health development plan</td>
<td>DOST</td>
<td>None</td>
</tr>
<tr>
<td>Engaging academic and other research institutions</td>
<td></td>
<td>2016</td>
<td>MOA/MOU, research contracts, technical reports and products</td>
<td>ICAMR</td>
<td></td>
</tr>
<tr>
<td>Develop AMR research Agenda for animal health</td>
<td></td>
<td>2015</td>
<td>AMR Research Agenda</td>
<td>DA (PCC)</td>
<td>5,000,000.00</td>
</tr>
<tr>
<td>To disseminate scientific information relevant to AMR</td>
<td>Inventory of AMR-related researches on animals</td>
<td>2015</td>
<td>Database on local research</td>
<td>ICAMR</td>
<td>3,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Upgrade existing IT system</td>
<td>2016</td>
<td>Upgraded IT system</td>
<td>ICAMR</td>
<td></td>
</tr>
</tbody>
</table>
**Key Strategy 07:**
**Development of a Risk Communication Plan to combat AMR**

**Human Health**

The success and sustainability of all actions and commitments by various stakeholders in overcoming AMR necessitates good and effective communication in all levels from planning, implementation, monitoring and evaluation. A risk communication plan not only signifies infection control measures. It is also being able to provide relevant scientific information that is accessible to all and is effectively understood by all relevant stakeholders with strong emphasis on the role of every Filipino in the overall cause-and-effect picture of the AMR problem.

<table>
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<tr>
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<th>Measurement</th>
<th>Responsible Agency</th>
<th>Budget (Php)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop a targeted risk communication plan for AMR</td>
<td>Development of a risk communication plan and IEC materials</td>
<td>2015 onwards</td>
<td>Risk Communication Plan and IEC materials</td>
<td>DOH (PD and HPGS)</td>
<td>3,500,000.00</td>
</tr>
<tr>
<td></td>
<td>Production and distribution of IEC materials</td>
<td>2014-2016</td>
<td>IEC materials</td>
<td>DOH (PD and HPGS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conduct of advocacy meetings with stakeholders (targeted)</td>
<td>2015-2016</td>
<td>Minutes of the meeting</td>
<td>ICAMR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of AO for the AMR Awareness Month</td>
<td>2015</td>
<td>AO on AMR Awareness Month Issued</td>
<td>DOH (PD)</td>
<td></td>
</tr>
</tbody>
</table>

**Animal Health**

The development of standard treatment guidelines must be in line with proper training and education of farmers and veterinarians in the industry. The improvement of animal health constitutes that the professionals working in the sector are well-informed of the risks of their actions, and that information on antibiotics, AMR and animal health are well-disseminated. This tool is important in assessing the risks of AMR in animal health, and in determining the appropriate strategies to mitigate these challenges.
<table>
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<th>Responsible Agency</th>
<th>Budget (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop a targeted risk communication for AMR</td>
<td>Launch of AMR pledge in veterinary sector</td>
<td>2014</td>
<td>Number of Pledges</td>
<td>DA</td>
<td>5,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Conduct of KAP study for the farmers, stakeholders on prudent antimicrobial use/impact of uncontrolled use of antimicrobials</td>
<td>2015 onwards</td>
<td>Technical reports</td>
<td>DA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of risk communication plan specifically anchored to Good Veterinary Practices targeting veterinarians and IEC plan</td>
<td>2015 onwards</td>
<td>Risk Communication Plan and IEC materials</td>
<td>DA (NMIS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Production and distribution of IEC materials</td>
<td>2015 onwards</td>
<td>IEC materials</td>
<td>DA</td>
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<td>Conduct of advocacy meetings with stakeholders</td>
<td>2015 onwards</td>
<td>Minutes of the meeting</td>
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</table>
REFERENCES:


